

HIGH SPEED SPECTROSCOPY OF EXPLOSIONS OF METALIZED EXPLOSIVES

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Effects of thermobaric explosives on structures are presently being investigated by ISL. Simplified thermobaric explosive charges were designed, using fine metallic powder mixed with different oxidizers. Charges were detonated in a semi-confined environment, composed by two parallel walls separated by 3m. To evaluate the blast effect generated on the walls, comprehension of the post-combustion reactions is a necessary step. Metal particles are known to enhance these reactions as reflected shock waves compress the combustion products. A recently developed experimental technique of high speed spectroscopy was calibrated and tested with the generic explosive charges. The capability of recording one spectrum every millisecond for a maximum duration of 2 seconds allowed us to identify the timing and location of the metal particle combustion. Changes in particle nature, shape and size were also investigated. Emission spectra were confronted to high speed thermocouple and pressure sensor signals recorded simultaneously for each explosion.